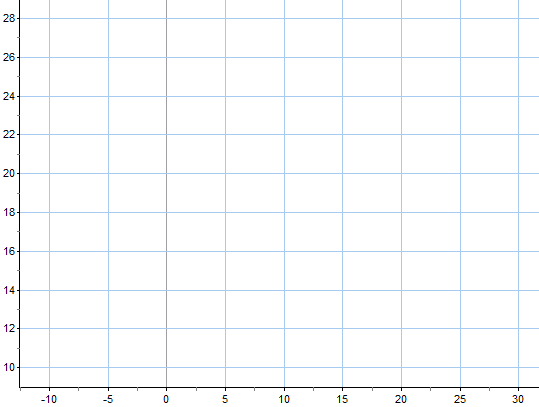
Stat and Data Analysis Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Review problem 3 Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_ Block: \_\_\_\_\_\_\_

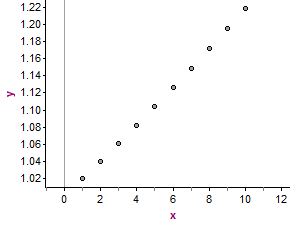
A study was done on the viability of using polystyrene cylinders as alternatives to natural trees in areas that have been deforested for nest of woodpeckers and other animals. Of the many variables recorded the researchers measured the depth of a cavity the woodpecker would make in the cylinder and the ambient temperature. The following table shows the values.

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Temp(℃) | -6 | -3 | -2 | 1 | 6 | 10 | 11 | 19 | 21 | 23 | 25 | 26 |
| Depth(cm) | 21.1 | 26.0 | 18.0 | 19.2 | 16.9 | 18.1 | 16.8 | 11.8 | 11.0 | 12.1 | 14.8 | 10.5 |

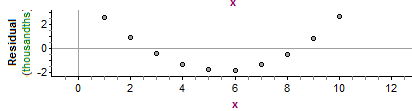
1. Draw the scatterplot. Describe the scatterplot.



1. Find the **LSRL** and the **correlation** and write them below. Add the LSRL to the scatterplot above.
2. What is the slope? Interpret it in the context of the problem.
3. What is the coefficient of determination? Interpret it in the context of the problem.
4. What percent of the changes in the depth is not explained by changes in the temperature?
5. What might be some other reasons for the change in the depth?
6. What depth does the model predict if the temperature was 10℃?
7. What is the residual for the prediction from #7? Was this an underestimation or an overestimation?
8. What depth would your model predict for a temperature of 40℃? How much faith do you have in this prediction? Explain.
9. Sketch the residual plot below.
10. Does the linear model seem appropriate? Explain.
11. Given the scatterplot and correlation below what would you conclude about the appropriateness of the linear model?



1. Here is the residual plot from the LSRL for the scatterplot above.



What does the residual plot tell you about the appropriateness of the linear model?

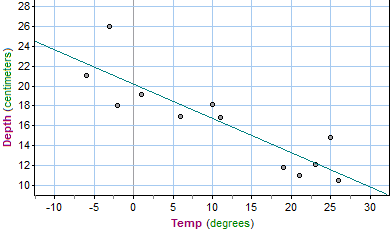
Stat and Data Analysis 42 pts Name: \_\_\_\_\_\_\_\_KEY\_\_\_\_\_\_\_\_\_\_\_\_\_\_

CW 4.2 Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_ Block: \_\_\_\_\_\_\_

A study was done on the viability of using polystyrene cylinders as alternatives to natural trees in areas that have been deforested for nest of woodpeckers and other animals. Of the many variables recorded the researchers measured the depth of a cavity the woodpecker would make in the cylinder and the ambient temperature. The following table shows the values.

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Temp(℃) | -6 | -3 | -2 | 1 | 6 | 10 | 11 | 19 | 21 | 23 | 25 | 26 |
| Depth(cm) | 21.1 | 26.0 | 18.0 | 19.2 | 16.9 | 18.1 | 16.8 | 11.8 | 11.0 | 12.1 | 14.8 | 10.5 |

1. Draw the scatterplot. Describe the scatterplot. (8)



Negative

Linear

Moderately strong(r = -0.876)

No outliers

1. Find the LSRL and the correlation and write them below. Add the LSRL to the scatterplot above. (3)

y = -0.345x + 20.125 r = -0.876

1. What is the slope? Interpret it in the context of the problem.(4)

For every increase of 1℃ in the Temperature, there tends to be a decrease of 0.345 cm in the depth of the cavity.

1. What is the coefficient of determination? Interpret it in the context of the problem.(3)

R2 = 76.7% 76.7% of the change in the depth is explained by changes in the temperature(or in the model)

1. What percent of the changes in the depth is not explained by changes in the temperature?(1)

23.3%

1. What might be some other reasons for the change in the depth? (1)
2. What depth does the model predict if the temperature was 10℃?(3)

y = -0.345(10) + 20.125

y = 16.675 cm

1. What is the residual for the prediction from #7? Was this an underestimation or an overestimation? (4)

residual = 18.1 – 16.675

residual = 1.425 cm underestimation

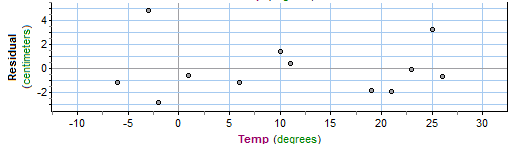
1. What depth would your model predict for a temperature of 40℃? How much faith do you have in this prediction? Explain. (4)

y = -0.345(40) + 20.125

y = 6.325 cm

I have very little faith in this prediction since 40 is so far out of the data set.

1. Sketch the residual plot below. (2)



1. Does the linear model seem appropriate? Explain. (3)

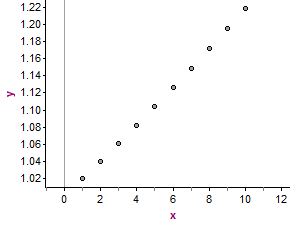
Yes the linear model seems appropriate.

The scatterplot appears linear

The correlation is moderately strong

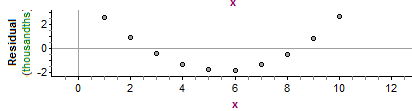
There is no obvious pattern in the residual plot.

1. Given the scatterplot and correlation below what would you conclude about the appropriateness of the linear model? (3)



Since the scatterplot looks very linear and the correlation is so strong it does appear that the linear model is appropriate.

1. Here is the residual plot from the LSRL for the scatterplot above.



What does the residual plot tell you about the appropriateness of the linear model? (3)

The linear model doesn’t appear to appropriate, since there is clearly a curve within the residual plot.